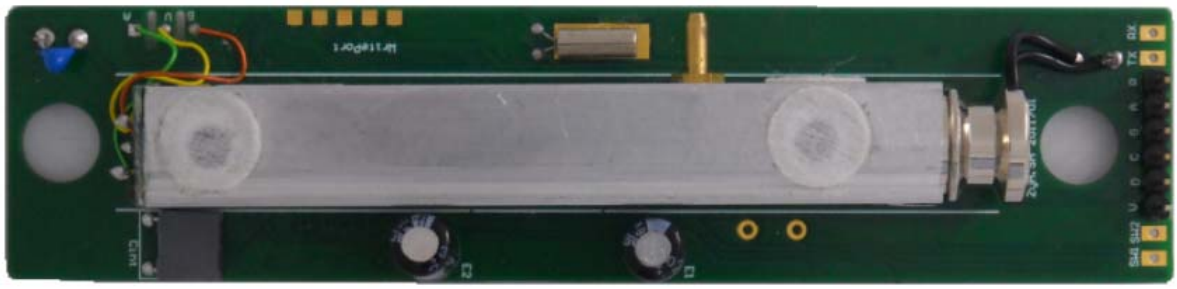
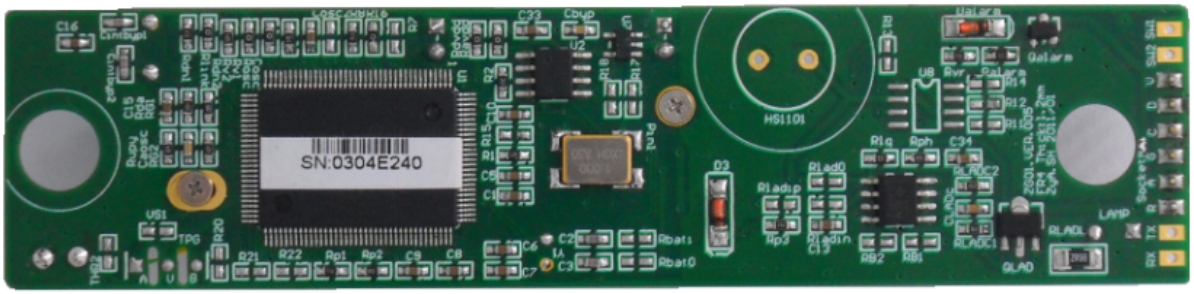
ZG01 CO2 Module

User Manual





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1 General Description

This document describes the user guide of ZG0 Series (ZG01).

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2 Features of Design

ZyAura, a world class leader and supplier of IR sensor technology and temperature measurement devices, is pleased to introduce a new CO2 monitor for use in scientific, commercial, and consumer applications. The ZG01 is a new and low-cost carbon dioxide monitor implementing IR-SoC technology; it can accurately detect carbon dioxide levels between 0 to 3000 ppm. This gas monitor is suitably fit for applications in Indoor Air Quality (IAQ), HVAC, safety, and other industries.

3 Specification

Measurement Method	NDIR
Sample Method	Diffusion or flow through (50~200ml/min)
Measurement Range	0~3000ppm/0.3%
Operating TempRange	32 to 122° F (0-50°C) 0-95% RH,non-condensing
Storage Range	-20~60C,95%RH
Temperature Dependence	Typ.±0.2% of reading per °C or ±2 ppm per °C, whichever is greater, referenced to 25°C
■Accuracy	
CO2 Accuracy	+/-50ppm or 5% of reading
Ambient Temperature Accuracy	±2°F (±1°C) When the fan blows to the device directly, the accuracy of temperature is + / -1.5 °C.
Temp Response Time	20-30 minutes (case must equilibrate with environment)
Pressure Dependence	0.13% of reading per mm Hg
Repeatability	20ppm
Resolution	1ppm
■Outputs	
Output Interface	6pin Vertical Connector, Space=2.54mm
Digital Output	CO2 & Tamb in ZyAura Protocol
OC (Open Collector)Output	Fixed setpoint, factory set at 1000 ppm, 50 ppm hysteresis
■Power Supply	
AC/DC Supply	5VDC supply (+/-5%),Ripple and Noise (mVp-p) 200
■Warm Up & Response	
Response Time #R1 (63% Rise Time)	About 2min
Warm Up Time(CO2)	<60 sec
Update Period	7 sec
Warm Up Time(Ambient Temp)	20~30min
Dimension	119x28x13.2mm (4.68x1.10x0.52 inch)
Weight	49g (1.73 oz)without attachment

Pin Assignment of ZG01

Warning: The Dimension in this drawing is for reference only.

V: Vdd **G**: GND

D: Data (Serial Data) **C**: Clock (Serial Clock)

A: Open collector output **R:** Reset

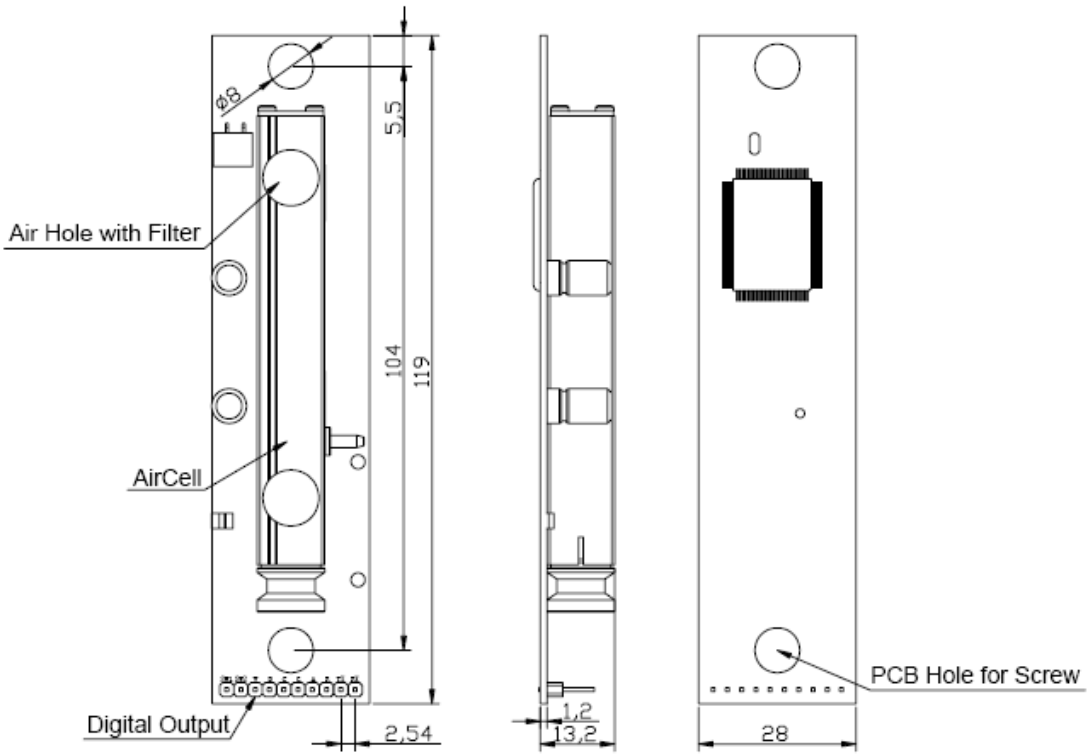

Fig1. The Module External Drawing

4 Serial Output

4.1 Typical Diagram

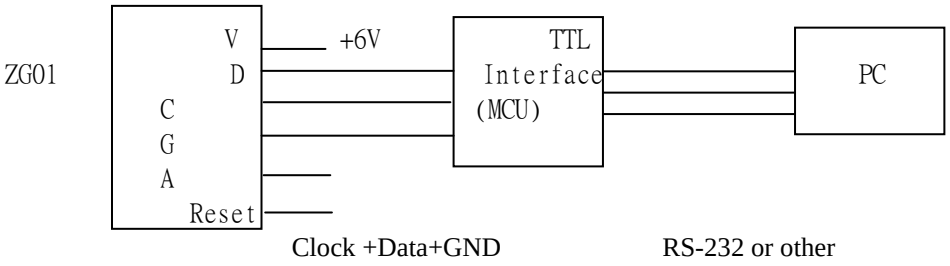

Fig2. Typical Diagram

ZG01 to TTL Interface (MCU)
V: Vcc
D: Data
C: Clock (2KHz)
G: GND
A: Open Collector
Reset: Restart the device

The voltage specifications of timing SPIr:
SPIr of ZG01 can compatible with 3.3Vdc CMOS，
Data, Clock，Reset Pin
ViH>=2.0Vdc, ViL<=0.8Vdc,
VoH>=2.4Vdc (Rload<0.5mA), VoL <= 0.8Vdc (Rload<0.5mA)

Clock Pin is high when there is no data out, the time out is >2ms.

1) The function of resetting the pin is that: when user's MCU cannot receive data of ZG01 normally, then user can restart ZG01 by controlling Reset Pin's electrical level to receive the data again.

2)Reset Pin: Pulling low level until 100ms（<0.8Vdc）, then pull high level（>2.0Vdc）,user can restart ZG01.

4.2 Timing of SPIr

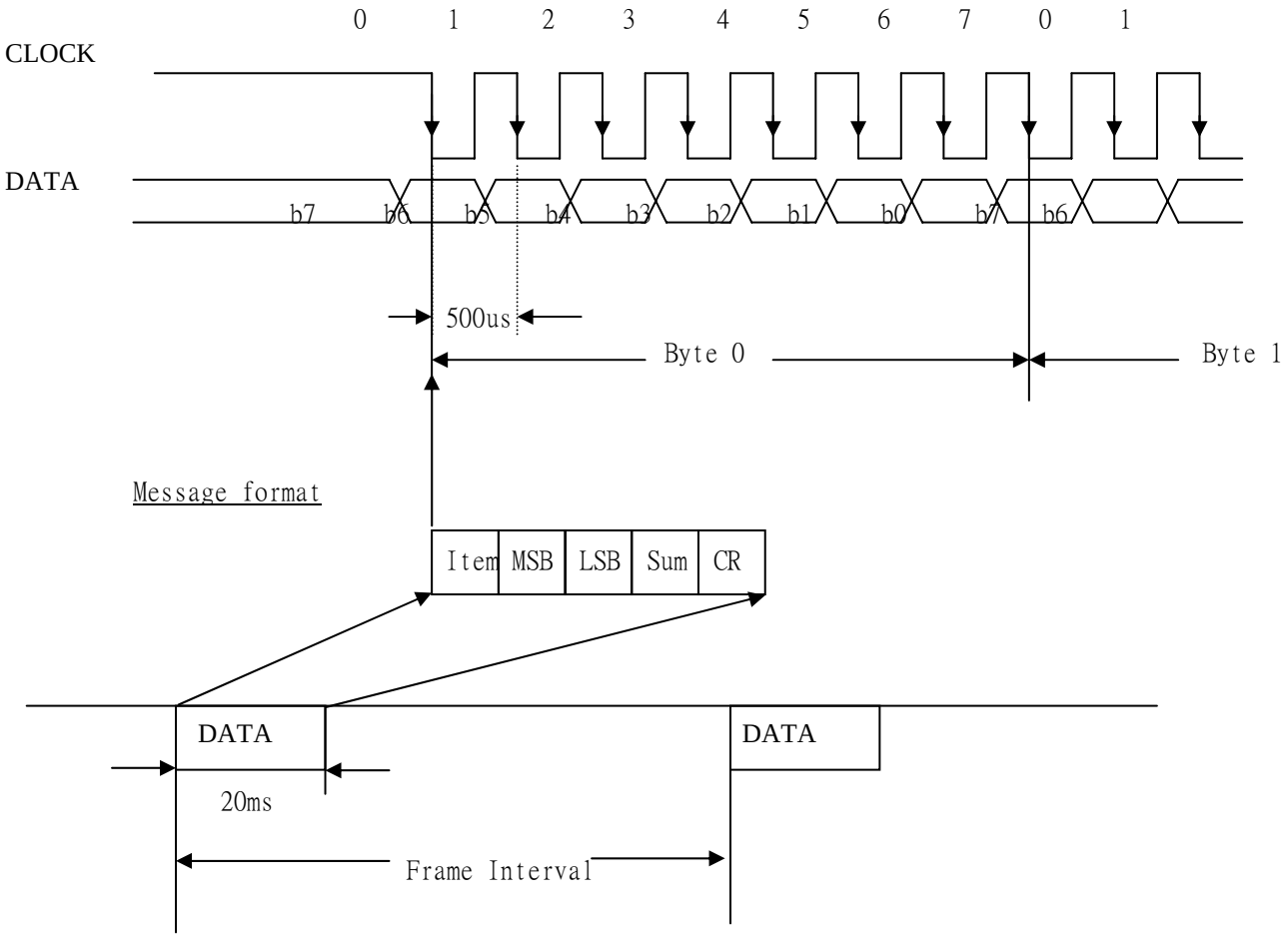

Fig3. Timing of SPI

4.2.1 Format of Message

Item	MSB	LSB	Sum	CR

Item "B" (42h): Tobj (Temperature of Obj)
MSB 8 bit Data Msb
LSB 8 bit Data Lsb
Sum Item+MSB+LSB=SUM
CR 0Dh, End of the message

There are 2 kinds of SPIr output format: Hex or BCD (default) format
Below is Hex format output:

Co2 Output:

50	02	58	AA	0D

Item 50h→ "P" the item code of CO2 concentration
Data MSB 02h
LSB 58h
Real CO2 concentration 600ppm
Sum CheckSum 50h+02h+58h=AAH (Only Low Byte)
HexToDec (0258H) =600
CR 0Dh →'Carriage Return' means End of Message

Temp Output:

42	12	82	D6	0D

Item 50h→ "B" the item code of Temp concentration
Data MSB 12h
LSB 82h
Real Temp value is 23℃
HexToDec (1282H) =4738; 4738/16-273.15=23
Sum CheckSum 42h+12h+82h=D6H (Only Low Byte)
CR 0Dh → 'Carriage Return' means End of Message

Below is BCD format output:

42	25	50	B7	0D

Item 42h→ "B" the item code of Object temperature
Data MSB 25h
LSB 50h
Real Ambient Temperature Value: 25.50degC
Sum CheckSum 42h+25h+50h=B7H (Only Low Byte)
CR 0Dh →'Carriage Return' means End of Message

50	06	54	AA	0D

Item 50h→ "P" the item code of CO2 concentration
Data MSB 06h
LSB 54h
Real CO2 concentration 654ppm
Sum CheckSum 50h+06h+54h=AAH (Only Low Byte)
CR 0Dh →'Carriage Return' means End of Message

5 Interface Demo Board: ZGhub

General Description:

ZGhub is an Interface box with LCD, for ZG0mseries.
This Box can work as an interface between the CO2 monitor module and PC. See Fig.5
"ZGhub" has a 2-column character type LCD Display, it can also work without the PC.
The Hub will show CO2 & Tamb (data from the ZG0m) continuously.

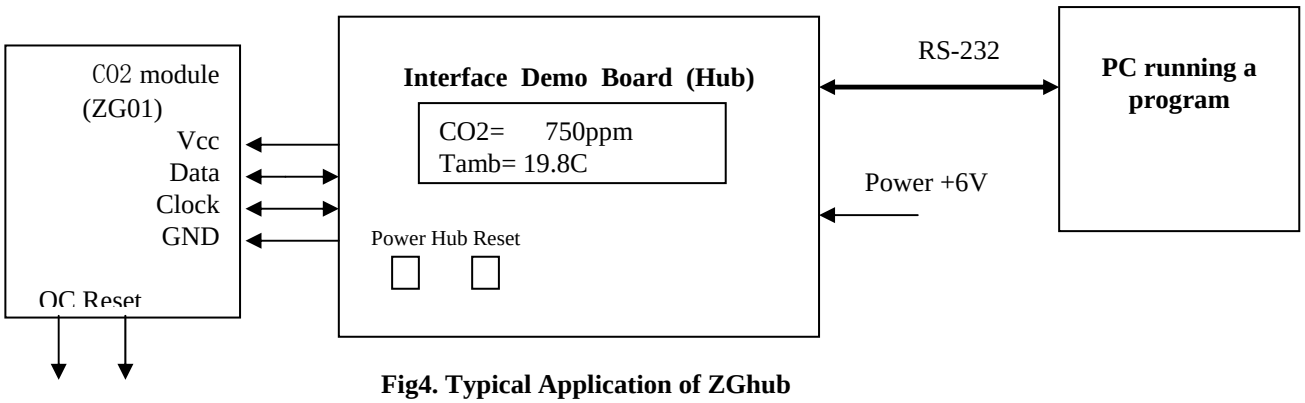

Fig4. Typical Application of ZGhub

Model No: ZGhub

Fig5.Zghub

OC (Pin A) is an alarm level, When CO2>alarm level, OC pin will be pulled at low level. When CO2<(alarm level-hysteresis level)，OC pin will at the level of suspended.

Notes：
By OC (Pin A) Control terminal current IC<0.2A, Vce<24VDC
Reset Pin/ Hardware Reset

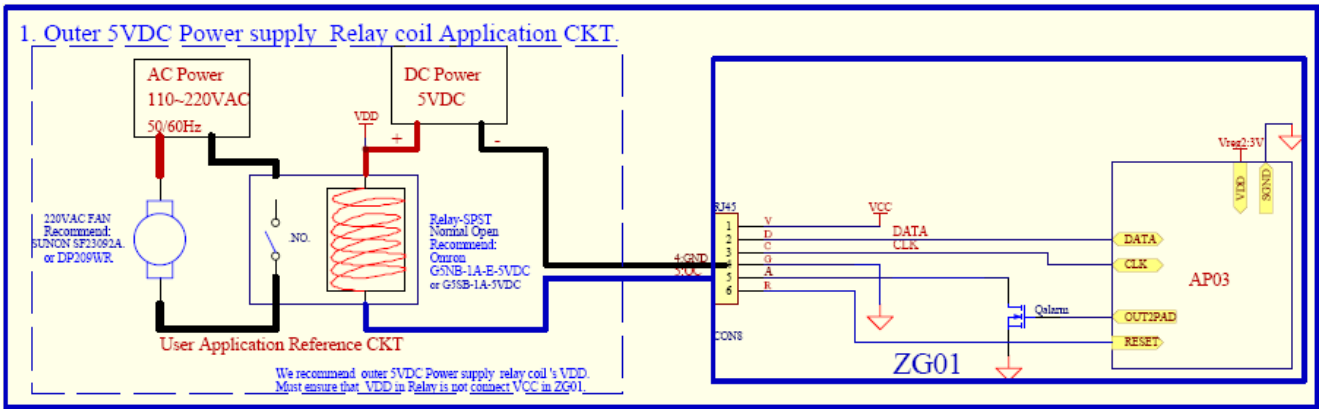

Fig6.The recommended circuit of OC controller

Please note：

1) **When ZGhub is connected with ZG01, please confirm the connection sequence of pin and pin before connect to power, otherwise it may damage ZG01.**
2) **ZG01 sample is with LCD display, it is convenient for debug, but actual mass production is without it.**
3) **ZG01 on the Demonstrates drawing is be powered by HUB.**

6 ZGview: Interface Program for PC

Program: ZGview

A Free version for demonstration can be downloading at http://www.zyaura.com/support/default.asp

- Running under Window operating system
- Must be used accompanied with ZGhub
- This program will show the curve of :
  CO2 (ppm); Tamb (degC) continuously
- Modification of the setting ,such as Alarm Level

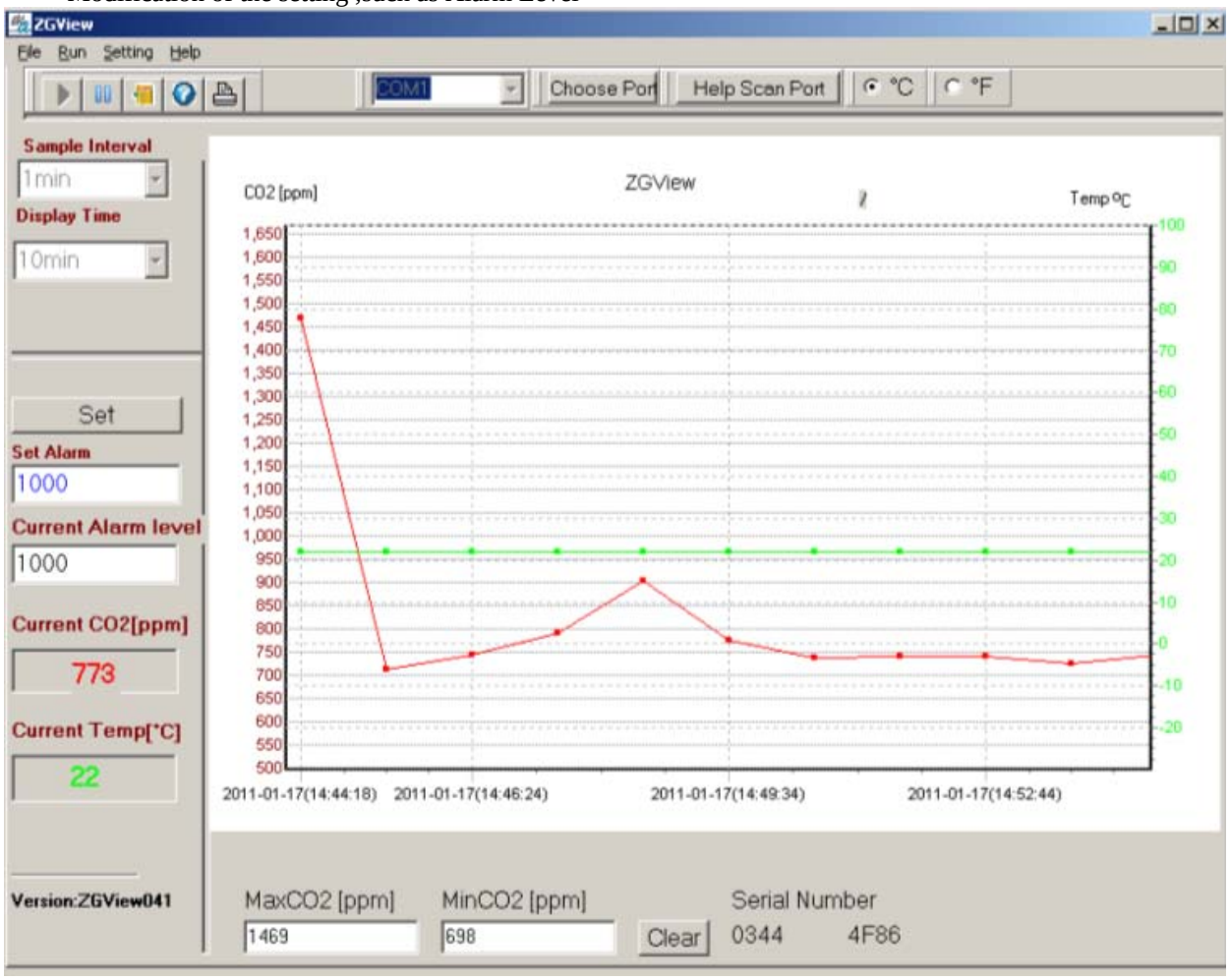

Fig7.ZGview Window